

**WHAT WE CLAIMED IS:**

1. An image processing device for converting color image data expressed by a first color system to image data  
5 expressed by a second color system representing each pixel data as a dot on/off state for each color, the image processing device comprising:

a color conversion unit that converts color image data expressed by the first color system to color image data  
10 expressed by the second color system;

an edge detection unit that detects an edge existed in a first type of block into which specified adjacent pixels are grouped;

a compressed data storage unit that compresses the  
15 color image data of pixels contained in the first type of block for which no edge is detected and stores the compressed color image data in a memory;

a data decompression unit that decompresses the compressed color image data read from the memory to color  
20 image data of each pixel and groups specified adjacent pixels into a second type of block; and

a dot formation judgment unit that judges in block units for each color of the second color system the dot on/off state for each pixel contained in the block based on  
25 the decompressed color image data of pixels grouped into the second type of block.

2. The image processing device according to claim 1, wherein

the dot formation judgment unit handles the color image data of each pixel grouped as the second type of block as uniform image data and judges the dot on/off state for pixels using the uniform image data, the case where the color image data of pixels are not compressed because of no edge detection in the block.

3. The image processing device according to claim 1, wherein

10 the edge detection unit detects the edge within the first type of block based on the color image data after the color conversion for each pixel within the block; and

the compressed data storage unit stores the compressed data in the memory after the converted color image data is compressed according to a result of the edge detection within the first type of block.

4. The image processing device according to claim 1, wherein

20 the edge detection unit detects the edge within the first type of block based on the color image data before the color conversion for each pixel within the block; and

the compressed data storage unit, after compression of color image data of pixels contained in the first type of block for which the color conversion is not performed and the edge is not detected, performs the color conversion of the compressed color image data to color image data of the second color system and stores the converted color image data in the memory.

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5. The image processing device according to claim 4,  
wherein

the edge detection unit performs another edge detection  
based on the color image data after the color conversion for  
5 the first type of block for which the edge is detected based  
on the color image data before the color conversion; and

the compressed data storage unit compresses the image  
data after the color conversion according to the result of  
another edge detection for the first type of block and  
10 stores the compressed color image data in the memory.

6. The image processing device according to any of claims  
1 through 5, wherein

the compressed data storage unit compresses the image  
15 data of pixels contained in the block to one pixel of image  
data for the first type of block in which no edge is  
detected and stores the compressed image data.

7. The image processing device according to claim 6,  
20 wherein

the compressed data storage unit compresses the image  
data of pixels contained in the block for the first type of  
block which no edges is detected to an average value of the  
color image data and stores the average data in a memory as  
25 compressed color image data.

8. The image processing device according to claim 6,  
wherein

the compressed data storage unit that compresses the  
30 image data of pixels contained in the block for the first

type of block which no edge is detected to an image data of one pixel selected from within the block, and stores the image data as compressed color image data.

5 9. The image processing device according to any of claims 1 through 5, wherein

the compressed data storage unit that, when an edge is detected within the first type of block, divides that block into sub-blocks that do not contain edges, compresses image data after the color conversion for pixels contained in each sub-block, and stores the compressed color image data in the memory.

10 10. The image processing device according to any of claims 1 through 5, wherein

the compressed data storage unit that stores in the memory the color converted image data that is compressed according to the result of the edge detection together with an compressed information expressing a state of the color image data being compressed.

11. The image processing device according to any of claims 1 through 5, wherein

the data decompression unit that groups pixels contained in the first type of block as the second type of block.

12. The image processing device according to claim 11, wherein

the edge detection unit and the data decompression unit that respectively group the four pixels aligned in 2 rows and 2 columns as the first type of block and the second type of block.

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13. An image processing device for converting color image data expressed by a first color system to image data expressed by a second color system representing each pixel data as a dot on/off state for each color, the image  
10 processing device comprising:

a color conversion unit that converts color image data expressed by the first color system to color image data expressed by the second color system;

an edge detection unit that detects an edge existed in  
15 a first type of block into which specified adjacent pixels are grouped;

a compressed data storage unit that compresses the color image data of pixels contained in the first type of block for which no edge is detected and stores the  
20 compressed color image data in a memory;

a data decompression unit that decompresses the compressed color image data read from the memory to color image data; and

a dot formation judgment unit that judges for each  
25 color of the second color system the dot on/off state based on the decompressed color image data.

14. An image processing method for converting color image data expressed by a first color system to image data  
30 expressed by a second color system representing each pixel

data as a dot on/off state for each color, the image processing method comprising:

converting color image data expressed by the first color system to color image data expressed by the second color system;

detecting an edge existed in a first type of block into which specified adjacent pixels are grouped;

compressing the color image data of pixels contained in the first type of block for which no edge is detected and storing the compressed color image data in a memory;

decompressing the compressed color image data read from the memory to color image data of each pixel and grouping specified adjacent pixels into a second type of block; and

judging in block units for each color of the second color system the dot on/off state for each pixel contained in the block based on the decompressed color image data of pixels grouped into the second type of block.

15. An image processing method for converting color image data expressed by a first color system to image data expressed by a second color system representing each pixel data as a dot on/off state for each color, the image processing method comprising:

converting color image data expressed by the first color system to color image data expressed by the second color system;

detecting an edge existed in a first type of block into which specified adjacent pixels are grouped;

compressing the color image data of pixels contained in the first type of block for which no edge is detected and storing the compressed color image data in a memory;

decompressing the compressed color image data read from  
5 the memory to color image data; and

judging for each color of the second color system the dot on/off state based on the decompressed color image data.

16. A program for realizing using a computer a method for  
10 converting color image data expressed by a first color system to image data expressed by a second color system representing each pixel data as a dot on/off state for each color, the program realizing:

a function for color converting color image data  
15 expressed by the first color system to color image data expressed by the second color system;

a function for detecting an edge existed in a first type of block into which specified adjacent pixels are grouped;

20 a function for compressing the color image data of pixels contained in the first type of block for which no edge is detected and storing the compressed color image data in a memory;

a function for decompressing the compressed color image  
25 data read from the memory to color image data of each pixel and grouping specified adjacent pixels into a second type of block; and

a function for judging in block units for each color of the second color system the dot on/off state for each pixel

contained in the block based on the decompressed color image data of pixels grouped into the second type of block.

17. A program for realizing using a computer a method for  
5 converting color image data expressed by a first color system to image data expressed by a second color system representing each pixel data as a dot on/off state for each color, the program realizing:

10 a function for color converting color image data expressed by the first color system to color image data expressed by the second color system;

a function for detecting an edge existed in a first type of block into which specified adjacent pixels are grouped;

15 a function for compressing the color image data of pixels contained in the first type of block for which no edge is detected and storing the compressed color image data in a memory;

20 a function for decompressing the compressed color image data read from the memory to color image data; and

a function for judging for each color of the second color system the dot on/off state based on the decompressed color image data.